220175

FLOOD INSURANCE STUDY

TOWN OF PORT BARRE, LOUISIANA
ST. LANDRY PARISH

OCTOBER 15, 1980

federal emergency management agency
federal insurance administration

COMMUNITY NUMBER - 220175

FEMA 209

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FLOOD INSURANCE STUDY
TOWN OF PORT BARRE, LOUISIANA

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the Town of Port Barre, St. Landry Parish Louisiana, and to aid in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of the information will be to convert the Town of Port Barre to the regular program of flood insurance by the Federal Insurance Administration (FIA). Further use of the information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

The hydrologic and hydraulic analyses for this study were performed by the Soil Conservation Service Alexandria, Louisiana, for the Federal Insurance Administration under Interagency Agreement No. IAA-H-17-78 Project Order No. 9. This work, which was completed in June 1979, covered all significant flooding sources in the Town of Port Barre.

1.3 Coordination

In July 1977, the Soil Conservation Service (SCS) in Louisiana was authorized to proceed with a Flood Hazard Analysis (FHA) Study of the Town of Port Barre. On August 31, 1977, SCS personnel made a field trip to Port Barre to identify problem areas, collect available data, and plan field surveys. Subsequently, a contract for field surveys was negotiated, maps were prepared and some basic data was assembled in preparation for hydraulic analysis. The field surveys were completed in April 1978; but before hydraulic analyses were started, the FHA study was converted to a Flood Insurance Study (FIS). Representatives of the FIA and the SCS met on June 6, 1978, to prepare a Time and Cost Report, and identify areas to be studied.

Coordination on the hydraulic and hydrologic analyses was achieved with the U.S. Army Corps of Engineers (COE), New Orleans District, and Professional Engineering Consultants Corporation, Baton Rouge, Louisiana. The consultant firm will be conducting a flood insurance study of St. Landry Parish.

On February 29, 1980, results of the study were reviewed at the final meeting attended by representatives of the FIA, the study contractor, and community officials.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Port Barre, St. Landry Parish, Louisiana. The area of study is shown on the Vicinity Map (Figure 1). The corporate limits enclose an area of approximately 665 acres.

The limits of the study were determined jointly by community officials, the SCS, and the FIA. Flooding within the corporate limits caused by overflow from Bayou Courtableau and Bayou Teche was studied in detail, a distance of about 0.8 mile along Bayou Courtableau and about 1.4 miles along Bayou Teche. Shallow flooding occurs in the southeast part of the town, a distance of about 1/4 mile along a small drainageway (SE ditch). Here, the drainage area of SE ditch is less than 1/2 square mile.

2.2 Community Description

The Town of Port Barre is located in south central Louisiana at the central part of St. Landry Parish. It is situated just north of U.S. Highway 190, about 45 miles east of Opelousas, Louisiana.

Port Barre was settled in the middle 18th century. It is located in the Mississippi River alluvial flood plain on the banks of Bayou Courtableau and Bayou Teche. Since the settlement of Port Barre, Bayou Courtablea has flowed through the town and into the Atchafalaya River, 15 miles to the southeast. Bayou Teche, a distributary of Bayou Courtableau, leaves Bayou Courtableau in the corporate limits of Port Barre and flows southward about 60 miles to the Gulf of Mexico. Both bayous are typical alluvial streams with high banks. That is, the land along the banks of the bayous must drain away from the bayous to swamps on either side. The drainage area of Bayou Courtableau above Bayou Teche, owing to the interchange of flow between basins, is about 936 square miles.

According to the U.S. Census, the population of Port Barre increased from 1,837 in 1960 to 2,056 in 1970, an increase of 11.9 percent.

The principal developments in Port Barre are along the high stream banks of Bayou Courtableau and Bayou Teche, but the town is growing. This growth has pushed developments, mostly single family residences, into the surrounding slightly lower elevations. The land surrounding Port Barre is devoted to agricultural uses.

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF PORT BARRE, LA
(ST. LANDRY PARISH)

APPROXIMATE SCALE
8 0 8 16 24 MILES

VICINITY MAP

The climate is humid; average annual temperature is about 68 degrees F. Summer and winter temperatures range from about 92 degrees F to about 40 degrees F, respectively. Average annual rainfall is about 56 inches. May is the wettest month and September is the driest. Over 50 percent of the rainfall occurs during the six-month period April through September.

2.3 Principal Flood Problems

Flood problems in Port Barre are caused by floodwater from Bayou Courtableau which drains an area of about 936 square miles. Often, this condition is aggravated by coincident high stages in the Atchafalaya Floodway. Additionally, the southeast part of town, being rather flat, floods from intense rainfall. This problem also, is aggravated by coincident high stages in downstream channels.

Port Barre is protected from flooding by the Mississippi River by levees and the Atchafalaya Floodway. Although the town has not been flooded by the Mississippi River since 1927, backwater from Bayou Courtableau is a threat when stages in the floodway are high, such as in 1973, when the Morganza floodgates were opened.

Port Barre is subject to flooding from Bayou Courtableau when intense rainfall occurs. This occurrred in 1953 and caused major damage. Although no major damage occurred in 1973, the situation would have been grave if heavy rainfall had occurred coincidental with high water in the floodway. Again in 1974 the water was high in Port Barre. This was caused by heavy, local rainfall coinciding with a rise in the Atchafalaya system. Drainage was impeded at the Courtableau drainage structure.

2.4 Flood Protection Measures

The COE has work, both completed and authorized, that relate to flooding in Port Barre. The largest flood on record of the Mississippi River occurred in 1927. This is the only flood that inundated the Town of Port Barre even though major floods occurred in 1929, 1932, 1935, 1937, 1945, 1950, and 1973. After the 1927 flood, Congress authorized a massive flood control program for the lower Mississippi Basin. As a result, the Atchafalaya Floodway was constructed to carry a flow of about 1,000,000 cubic feet per second (cfs). Work is underway to raise the floodway levees to carry a flow of about 1,500,000 cfs.

After the West Atchafalaya Basin protection levee was constructed, the COE constructed several landside drainage improvement projects.

The Bayou Des Glaises diversion channel, State Canal, and Bayou Roseau were completed in 1943. This diversion channel connects Bayou Des Glaises with the landside borrow pit channel of the West Atchafalaya Basin protection levee.

The Bayou D'Arbonne drainage structure was installed in 1941 in the West Atchafalaya Basin protection levee. It is used during low stages to permit flow from the West Atchafalaya Floodway to Bayou Teche through Bayou Courtableau.

The channel of Bayou Courtableau was blocked by constuction of the West Atchafalaya Basin protection levee but flow continued to the Gulf down the borrow pit channel. To induce low water flow into Bayou Teche at Port Barre, a diversion channel, and two reinforced concrete weirs were installed on the south bank of Bayou Courtableau just west of the West Atchafalyaya Protection Levee. The crests of the weirs were set at 18 feet above Nation Geodectic Vertical Datum of 1929 (NGVD). Flood flows pass over the weirs and continue down the borrow pit channel and low flow water flows down Bayou Teche into the Teche-Vermilion Basin where it is needed frequently for rice irrigation. This feature was completed in 1942.

In 1946, a project was initiated to reduce flood heights and improve drainage in the watersheds of Bayous Rapides, Boeuf, and Cocodrie. Channel work (about 60 miles) has been completed from near Alexandria to just above Washington (Bayou Rapides, Bayou Boeuf diversion channel). This project was authorized in 1941 and is complete except for the enlargement of 13.5 miles in upper Bayou Boeuf and 25.3 miles in Bayou Cocodrie.

In 1950, the Courtableau Drainage Structure and channels were completed. This consists of five reinforced concrete box culverts (each culvert is 10 feet wide and 15 feet high) through the West Atchafalaya Floodway Levee to conduct drainage flows from Bayou Courtableau into the floodway. This structure is located just downstrem from the two weirs installed in 1942.

Section 87 of the Water Resources Development Act of 1974 authorized the enlargement of Bayou Courtableau from the Town of Washington to the West Atchafalaya Protection Levee, in lieu of the previously authorized Washington-Courtableau Diversion Channel. This Act also authorized the construction of additional culverts through the West Atchafalaya Protection Levee to accommodate increased flow from the landside drainage work.

The uncompleted work in the Bayous Rapides, Boeuf, and Cocodrie project (Bayou Cocodrie and tributaries), the work authorized in 1974 by the Water Resources Development Act, and appropriate alternatives are being reviewed by the COE in an authorized survey now underway - Bayous Rapides, Boeuf, Cocodrie, and Outlets.

Another survey now underway and scheduled for completion in 1979 is "Eastern Rapides and South-Central Avoyelles Parishes." This project involves landside drainage channels and several water control structures.

3.0 ENGINEERING METHODS

For flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Floods having recurrence intervals of 10-, 50-, 100-, and 500-years have been selected as having special significance for flood plain management and for flood insurance premium rates. The analyses reported here reflect current conditions in the drainage areas of the streams.

3.1 Hydrologic Analyses

Depending on stages downstream, Bayou Courtableau at Port Barre may flow in either direction, therefore, stage-discharge relationships (rating curves) cannot be established. Hence, frequencies were computed based on stage data. Stage-frequency relationships were established using the stream gauge data of Bayou Teche at Port Barre (Gauge No. 07385450). This station is located at State Highway Bridge 103 in Port Barre and records are continuous from 1938. A gauging station (No. 07382790) is located on Bayou Courtableau at Port Barre just downstream from State Highway 103, but records here are discontinuous.

The stage frequency analysis followed the standard log-Pearson Type III method as outlined by the Water Resource Council Bulletin No. 17A. The period of record from 1938 to 1976 (38 years) was used in the analyses. Table 1 summarizes the analyses.

TABLE 1 - SUMMARY OF ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION ABOVE NGVD (feet)			
	10-YEAR	50-YEAR	100-YEAR	500-YEAR
Bayou Teche at Port Barre	24.3	27.0	28.2	30.4

For the area of shallow flooding, peak discharge-frequency-drainage area relationships were developed using Soil Conservation Service Technical Guide No. 40 (TG-40). The method is designed for computing peak flows in flatland areas. It utilizes rainfall amounts for selected frequencies and SCS runoff curve numbers in conjunction with the Cypress Creek drainage formula to compute a runoff removal rate of discharge. This discharge, modified by a peak factor and a drainage area factor establishes the peak discharge rate.

3.2 Hydraulic Analyses

Coordination efforts with the COE, New Orleans District, revealed that this agency had computed water-surface porfiles along Bayou Courtableau and Bayou Teche. Further, that in the vicinity of Port Barre, the average slope of the water-surface was about 0.7 ft./mile in Bayou Courtableau and about 0.4 ft./mile in Bayou Teche; these average slopes would remain constant for the range of flow frequencies. Thus, the flood profile for Bayou Teche was established by constructing the profile slope of 0.4 ft./mile through the elevation-frequency points developed at the gauge. Similarly, the flood profile of Bayou Courtableau was established by constructing the profile slope of 0.7 ft./mile through the elevation-frequency points established by the Bayou Teche profile at the confluence of Bayou Courtableau.

Field surveys were made sufficient to identify topography. Contours were plotted at one-foot intervals on an aerial photograph, scale 1" = 400 feet, constructed for the town.

Six channel cross sections, three on Bayou Courtableau and three on Bayou Teche, were surveyed at selected locations.

All elevations are referenced to NGVD; the elevation reference marks in the study are shown and described on the map.

Flood elevations in the Town of Port Barre may be raised by debris blockages of the streams in the study area. The hydraulic analyses for this study, however, are based only on the effect of unobstructed flow. The flood elevations as shown on the profiles are thus considered valid only if hydraulic structures in general remain unobstructed and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is used to indicate additional areas of flood risk in the community. For Bayou Courtableau and Bayou Teche, the boundaries of the 100-year flood were delineated on the aerial photogrpah prepared for the town (scale 1" = 400 feet). Boundaries were located by transferring elevations

at stations along the 100-year flood profile to the maps, and interpolating between the one-foot contours. This flood boundary was then transferred to the base map.

The boundary of the 100-year flood in the area of shallow flooding was developed using data from the TG-40 procedure and the prepared contour map.

4.2 Floodways

The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment in order that the 100-year flood be carried without substantial increases in flood heights.

The physical nature of the area precludes opportunity for a floodway.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each flooding source studied in detail affecting the the Town of Port Barre.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot

Two reaches meeting the above criteria were required for the flooding sources of the Town of Port Barre. These included one reach each for Bayou Courtableau and Bayou Teche. The locations of the reaches are shown on the Flood Profiles (Exhibit 1).

5.2 Flood Hazard Factors

The FHF is the FIA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the Town of Port Barre was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations.

Zone A0:	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; depths are shown, but no Flood Hazard Factors are determined.
Zone A8:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 2, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

This Flood Insurance Rate Map for the Town of Port Barre is, for insurance purposes, the principal result of the Flood Insurance Study. This map (Exhibit 2) contains the official delineation of flood insurance zones and base food elevation lines. Base flood elevation lines are shown at intervals of 0.1 or 0.2 feet because the slopes of the water-surface are flat. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

A Flood Insurance Study of St. Landry Parish is forthcoming. Flood profiles for Bayou Courtableau and Bayou Teche will match profiles to be used for the parishwide study. Other than studies mentioned in paragraph 2.4, no other studies were found to be relevant.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the Insurance and Mitigation Division, Federal Emergency Management Agency, Federal Center, Denton, Texas 76201.

8.0 BIBLIOGRPAHY AND REFERENCES

Evangeline Economic Development District, map of the Town of Port Barre, May 1978.

Mayne, Paul J., Miscellaneous Unpublished Flood Data for the Town of Port Barre.

U. S. Department of Agriculture, Soil Conservation Service, South Technical Service Center, Ft. Worth, Texas, "Technical Guide No. 40" dated February 26, 1971.

U. S. Department of the Army, Corps of Engineers, "Daily Stages of Bayou Teche at Port Barre, Louisiana."

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Bayou Courtableau Reach 1	0001	-3.9	-1.2	+2.2	040	A8	Varies
Bayou Teche Reach 1	0001	-3.9	-1.2	+2.2	040	A8	Varies
Shallow Flooding Area	0001	*	*	*	*	AO	Average Depth 2 feet

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT – SEE MAP

*Not determined for Shallow Flooding Areas.

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF PORTE BARRE, LA

(ST. LANDRY PARISH)

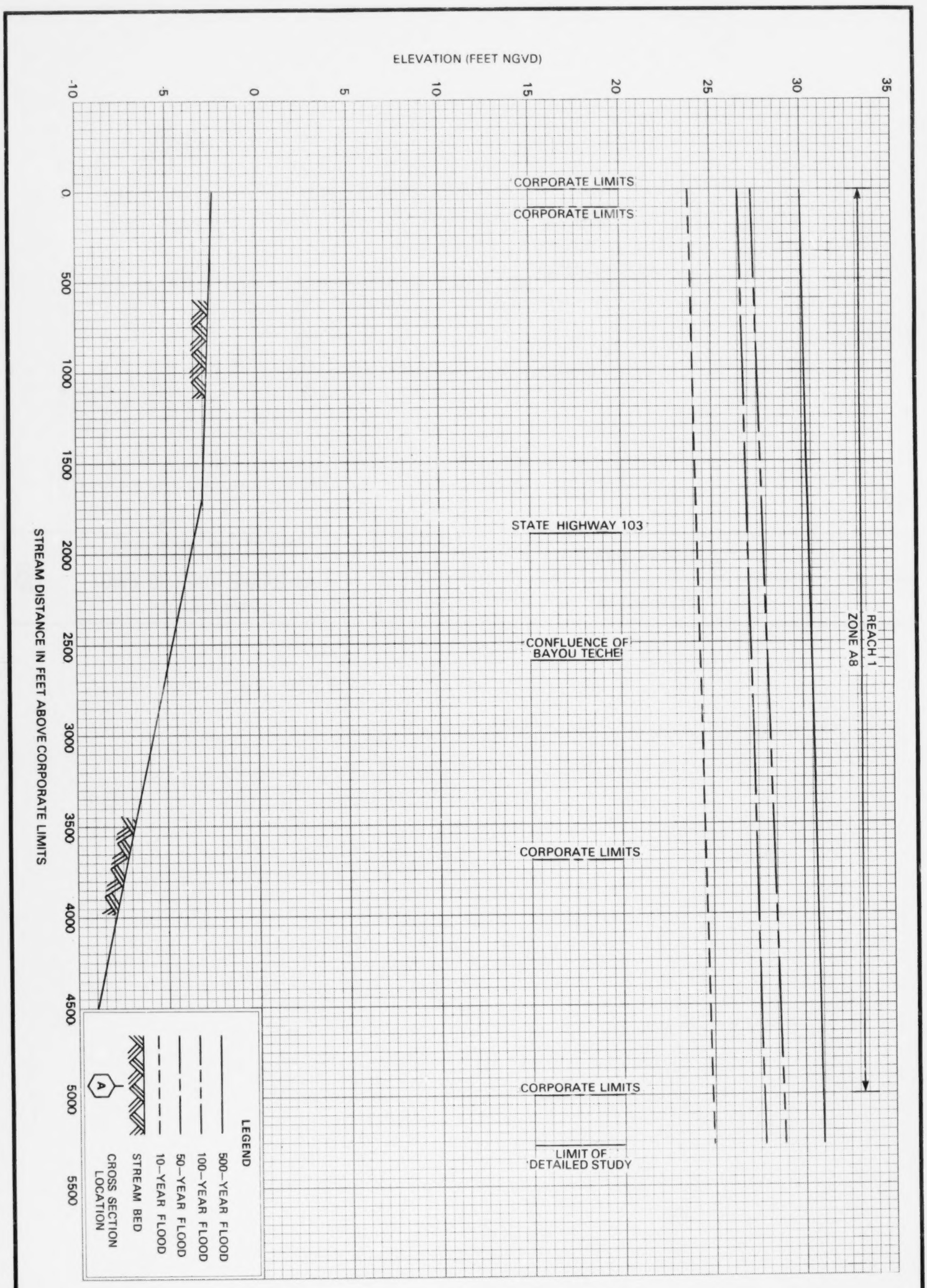
FLOOD INSURANCE ZONE DATA

BAYOU COURTABLEAU - BAYOU TECHE

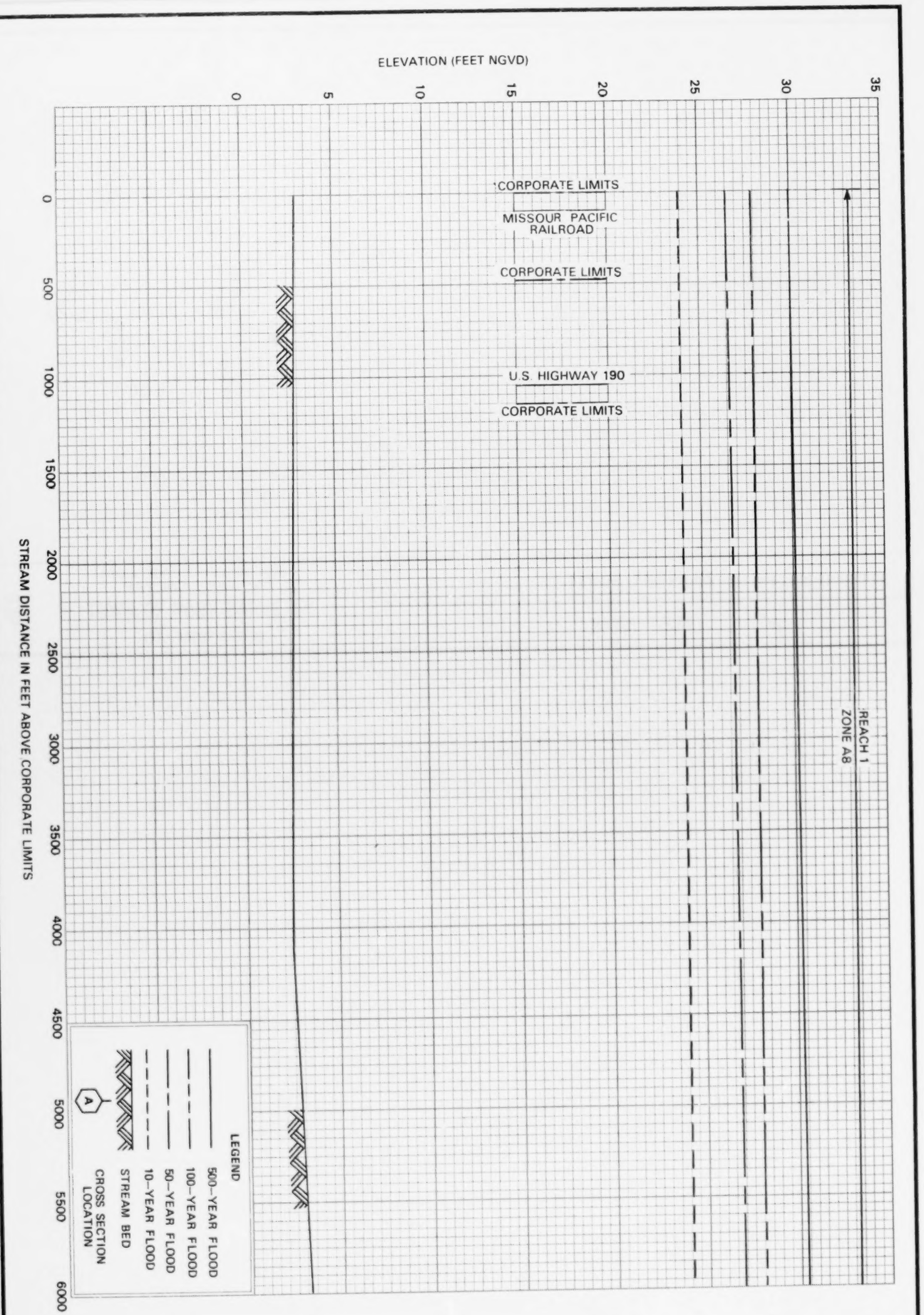
U. S. Department of the Interior, Geological Survey, in cooperation with the Louisiana Department of Highways, "Floods in Louisiana, Magnitude and Frequency," Third Edition, 1976.

U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Maps, Town of Port Barre.

U. S. Water Resources Council, "Guidelines for Determining Flood Flow Frequency," Bulletin No. 17A of the Hydrology Committee, Revised June 1977.



01P	FEDERAL EMERGENCY MANAGEMENT AGENCY Federal Insurance Administration **TOWN OF PORT BARRE, LA** (ST. LANDRY PARISH)	**FLOOD PROFILES** **BAYOU COURTABLEAU**



02P

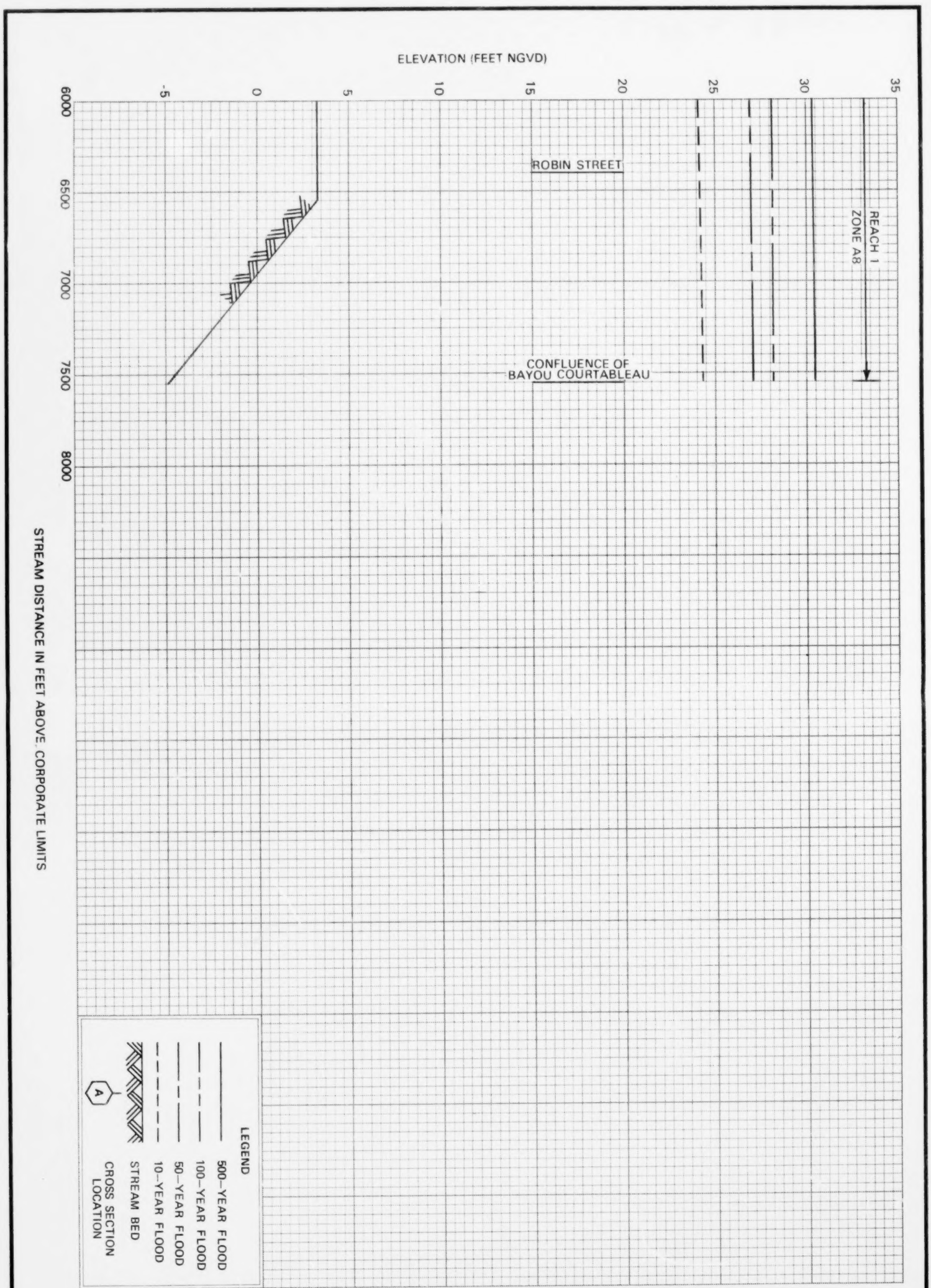
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF PORT BARRE, LA

(ST. LANDRY PARISH)

FLOOD PROFILES

BAYOU TECHE



03P

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF PORT BARRE, LA

(ST. LANDRY PARISH)

FLOOD PROFILES

BAYOU TECHE